

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
24 December 2003 (24.12.2003)

PCT

(10) International Publication Number
WO 03/106183 A1

(51) International Patent Classification⁷: **B41M 5/00**

(21) International Application Number: PCT/US03/11255

(22) International Filing Date: 10 April 2003 (10.04.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 18 DEC 04
10/175,020 18 June 2002 (18.06.2002) US

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(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,

LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations
- of inventorship (Rule 4.17(iv)) for US only

Published:

- with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **INK-RECEPTIVE FOAM ARTICLE**

(57) Abstract: The present invention is directed an oriented, foamed article having an ink-receptive surface, and a method of making the article. The invention provides a printable substrate comprising at least one high melt-strength, oriented polypropylene foam layer having an ink-receptive surface. The high melt-strength polypropylene having a melt strength of of 25 to 60 cN at 190°C. The ink-receptive surface may comprise and oxidizing treatment, such as corona or flame-treatment of the foam surface, or may comprise an ink-receptive coating, such as a primer coating, on the foam surface. The oriented foam article is particularly useful in the preparation of printed security documents such as currency, stock and bond certificates, birth and death certificates, land titles and abstracts and the like.

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B41M5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B41M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 209 519 A (EASTMAN KODAK CO) 29 May 2002 (2002-05-29)	1,3,7, 10,13, 15-18, 20-22, 24-26, 28,29, 31,32, 34,35, 52,53,55
Y	page 4, line 47 - line 54 page 5, line 28 page 6, line 9 - line 15 page 7, line 51 - line 52 ----- -/-	2-6, 8-10,27, 38,50

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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* & * document member of the same patent family

Date of the actual completion of the international search

31 July 2003

Date of mailing of the international search report

13/08/2003

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 03/11255

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 209 518 A (EASTMAN KODAK CO) 29 May 2002 (2002-05-29)	1
Y	page 4, line 47 - line 48 page 5, line 27 - line 28 page 6, line 9 - line 15 page 7, line 20 - line 21	2-6, 8-10, 27, 38-50
X	US 2001/000236 A1 (BENOIT GORDON L ET AL) 12 April 2001 (2001-04-12)	1, 36
Y	paragraphs '0002!', '0024!', '0025!', '0031!' - paragraph '0033!' examples 1-4	2-6, 8-10, 27, 38-50
Y	WO 02 00412 A (3M INNOVATIVE PROPERTIES CO ; GEHLSSEN MARK D (US); STROBEL JOAN M () 3 January 2002 (2002-01-03) cited in the application page 4, line 5 - page 19, line 8	2-6, 8-10, 27, 38-50
A	US 2002/051867 A1 (KOJIMA TAKU ET AL) 2 May 2002 (2002-05-02) paragraph '0008!' - paragraph '0011!'	1-56
A	US 5 489 471 A (INOUE MASAYUKI ET AL) 6 February 1996 (1996-02-06) column 3, line 12 - line 36	1-56

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/11255

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1209519	A	29-05-2002	US 6514659 B1	04-02-2003
			CN 1356590 A	03-07-2002
			EP 1209519 A2	29-05-2002
			JP 2002202576 A	19-07-2002
EP 1209518	A	29-05-2002	US 6447976 B1	10-09-2002
			EP 1209518 A2	29-05-2002
			JP 2002219764 A	06-08-2002
US 2001000236	A1	12-04-2001	US 6025059 A	15-02-2000
			US 6294267 B1	25-09-2001
			US 5935696 A	10-08-1999
			US 5879028 A	09-03-1999
			US 6270610 B1	07-08-2001
			US 5698333 A	16-12-1997
			US 5716695 A	10-02-1998
			US 5618630 A	08-04-1997
			AT 240843 T	15-06-2003
			AU 5178900 A	28-12-2000
			BR 0011530 A	26-02-2002
			CA 2369744 A1	14-12-2000
			CN 1358142 T	10-07-2002
			DE 60002870 D1	26-06-2003
			EP 1194300 A1	10-04-2002
			JP 2003501298 T	14-01-2003
			WO 0074948 A1	14-12-2000
			AU 749836 B2	04-07-2002
			AU 3294999 A	06-09-1999
			BR 9909209 A	02-10-2001
			CA 2321451 A1	26-08-1999
			EP 1056592 A1	06-12-2000
			JP 2002503569 T	05-02-2002
			WO 9942280 A1	26-08-1999
			AU 6052299 A	17-04-2000
			BR 9914085 A	24-07-2001
			CA 2344650 A1	06-04-2000
			EP 1124681 A1	22-08-2001
			JP 2002525226 T	13-08-2002
			TW 498026 B	11-08-2002
			WO 0018575 A1	06-04-2000
			US 2001000147 A1	05-04-2001
			AU 741620 B2	06-12-2001
			AU 3213499 A	08-11-1999
			BR 9909850 A	19-12-2000
			CA 2329734 A1	28-10-1999
			CN 1303331 T	11-07-2001
			EP 1117542 A1	25-07-2001
			JP 2002512141 T	23-04-2002
			WO 9954148 A1	28-10-1999
			AU 700625 B2	07-01-1999
			AU 2999295 A	30-01-1997
			CA 2220444 A1	16-01-1997
			CZ 9703606 A3	15-04-1998
			EP 0857108 A1	12-08-1998
			HU 76649 A2	28-10-1997
			HU 77829 A2	28-08-1998
			PL 323859 A1	27-04-1998
			SK 155597 A3	03-06-1998

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No
PCT/US 03/11255

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2001000236 A1		WO 9701438 A1	16-01-1997
WO 0200412 A	03-01-2002	AU 7008501 A	08-01-2002
		BR 0111787 A	20-05-2003
		CA 2411350 A1	03-01-2002
		EP 1296810 A2	02-04-2003
		WO 0200412 A2	03-01-2002
US 2002051867 A1	02-05-2002	JP 2001270226 A	02-10-2001
US 5489471 A	06-02-1996	JP 3299826 B2	08-07-2002
		JP 7102096 A	18-04-1995
		CN 1106739 A ,B	16-08-1995